

Remarks

Claims 1-17 and 21-23 are pending. Claims 1, 12, and 16 have been amended. Claims 18-20 have been cancelled. New claims 21-23 have been added. Reconsideration of this application in light of the above amendments and the following remarks is requested.

Rejections under 35 U.S.C. § 112

Although the Office action rejected claim 12 under 35 U.S.C. § 112, second paragraph, Applicant assumes that claim 16 was the intended claim as the claim language recited in the Office action is from claim 16, rather than claim 12. Accordingly, Applicant has amended claim 16 to address this rejection.

Rejections under 35 U.S.C. § 102(e)

Claims 1, 3-5, 12-14, 16, and 17 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,566,260 to Chooi et al. ("Chooi"). As the PTO provides in MPEP § 2131, "[t]o anticipate a claim, the reference must teach every element of the claim...." (emphasis added). Therefore, the cited reference must disclose all of the elements of the claims to sustain the rejection. Accordingly, Applicant respectfully traverses this rejection on the following grounds.

Claims 1 and 3-5

Claim 1, as amended, recites in part forming a glue layer on the first layer; performing an inter-treatment on the glue layer, wherein the inter-treatment affects the upper and lower surfaces of the glue layer and improves an adhesive interface between the glue layer and the first layer; and depositing the second layer onto the upper surface of the inter-treated glue layer, wherein the inter-treated glue layer improves adhesion between the first and second layers.

In contrast, Chooi is directed to "achieving a fluorine out-diffusion barrier without the need for an additional and space-consuming material layer" (col. 9, lines 25-27). To accomplish this, "a first plasma treatment of the upper surface of the first dielectric layer" is performed, and the "plasma treatment forms a 'pseudo-carbon nitride' layer (15), indicated as a shaded region, on

that upper surface" (col. 9, lines 47-48 and 53-55) (emphasis added). As such, not only is the "pseudo-carbon nitride layer" of Chooi not produced on the lower surface, but the "pseudo-carbon nitride layer" on a single side cannot improve adhesion between the first and second layers as required by claim 1. Accordingly, the cited text of Chooi fails to teach or suggest every element of the claim as required by MPEP § 2131, and claim 1 is allowable over the cited reference. Claims 3-5 depend from and further limit claim 1 and are allowable for at least the same reason as claim 1.

Furthermore, Applicant submits that the language of claim 1 reciting "wherein performing the inter-treatment improves an interface between the glue layer and the first layer" is limiting because it restricts the performed inter-treatment to one that improves an adhesive interface between the glue layer and the first layer. Such language is specifically recognized in MPEP § 2173.05(g), which recites that "[a] functional limitation must be evaluated and considered, just like any other limitation of the claim, for what it fairly conveys to a person of ordinary skill in the pertinent art in the context in which it is used. A functional limitation is often used in association with an element, ingredient, or step of a process to define a particular capability or purpose that is served by the recited element, ingredient or step."

Claims 12-17

Claim 12, as amended, recites in part depositing a dielectric layer; depositing a glue layer on the dielectric layer; selecting either a plasma treatment process or an electron beam treatment process; applying the selected treatment process to affect the upper and lower surfaces of the glue layer; forming a metal layer over the upper surface of the glue layer, wherein the treatment process enhances an adhesiveness between the dielectric layer and the metal layer.

In contrast, Chooi is directed to "achieving a fluorine out-diffusion barrier without the need for an additional and space-consuming material layer" (col. 9, lines 25-27). To accomplish this, "a first plasma treatment of the upper surface of the first dielectric layer" is performed, and the "plasma treatment forms a 'pseudo-carbon nitride' layer (15), indicated as a shaded region, on that upper surface" (col. 9, lines 47-48 and 53-55) (emphasis added). As such, not only is the "pseudo-carbon nitride layer" of Chooi different from the glue layer of claim 12, it is also not

produced on the lower surface as required by claim 12. Accordingly, the cited text of Chooi fails to teach or suggest every element of the claim as required by MPEP § 2131, and claim 12 is allowable over the cited reference. Claims 13, 14, 16, and 17 depend from and further limit claim 12 and are allowable for at least the same reason as claim 12.

Rejections under 35 U.S.C. § 103(a)

Claims 2, 6-11, and 15 stand rejected under 35 U.S.C. § 103(a) as being obvious over Chooi in view of various combinations of U.S. Patent No. 5,851,927 to Cox et al. ("Cox"), U.S. Patent No. 6,291,975 to Xia et al. ("Xia"), and U.S. Patent No. 5,798,146 to Murokh et al. ("Murokh"). Claims 2 and 6-11 depend from claim 1, which is allowable for reasons described above. Claim 15 depends from claim 12, which is allowable for reasons described above. Accordingly, claims 2, 6-11, and 15 are allowable for at least the same reason as the claim from which they depend.

New claims 21-23

New claim 21 recites a method for improving an interface in a semiconductor device comprising: forming a first metal layer; forming a glue layer on the first metal layer; performing an inter-treatment on the glue layer to alter upper and lower surfaces of the glue layer for improved adhesiveness; and forming a second metal layer on the upper surface of the glue layer.

Applicant submits that the cited references, whether taken singly or in combination, fail to teach or suggest each element of claim 21. Claims 22 and 23 depend from and further limit claim 21 and are allowable for at least the same reason as claim 21.

Conclusion

Applicant respectfully submits that all pending claims are in condition for allowance.
Should the Examiner have any further comments, the Examiner is invited to contact the
Applicant at the below listed number.

Respectfully submitted,

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